The Soybean Digest

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OF

THE AMERICAN SOYBEAN ASSOCIATION

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THE *Soybean Digest*

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ATTEND THE ASA CONVENTION

NO convention in the history of the American Soybean Association has come at so crucial a time in history as will the 1942 event. Plumped into a leading role in the war, the industry is veritably still in swaddling clothes. The growing process which would normally have taken years is being telescoped into only weeks and months.

Huge quantities of soybean flour going to our allies . . . . . rubber substitutes from soybean oil . . . . . plastics and plastic fillers from soybean oilmeal . . . . . soybean protein going into commercial usage on a large scale . . . . . shortage of combines for harvesting . . . . . shortage of storage to handle adequately the 1942 crop . . . . . where is the market for 50 percent more soybean oilmeal than ever before produced?? . . . .

Attend the 1942 ASA convention in September and participate in the discussions concerning this most crucial of times in the history of the industry.

MARKET SUMMARY

SOYBEANS

	July 9	June 25	June 10
July (old)	1.76¾	1.78⅜	1.69⅝
July (new)	1.77	1.80¼A	1.71⅜
October	1.76⅛	1.76¾	1.69¾
December	1.77⅞	1.78¼	1.71½

SOYBEAN OIL

	June 9	June 24	July 3
Tanks, Midwest Mills	11½c	11⅜c-T	11¼c-A

SOYBEAN MEAL

	July 8	June 25	June 5
July	36.75 @37.50	35.60b	32.00 @32.75
October	36.00 @37.00	35.50 @35.75	32.25 @33.00
December	35.75 @36.25	35.35 @36.00	32.25 @33.00

CASH CONVERSION SCALE

1 Bushel Soybeans, wt. 60 lbs.	1.76⅝
INTO	
8.8 lbs. Crude Oil @ 11¼c	.99
49.5 lbs. Meal @ 1.825c	.903
	1.893
Gross Processing Margin per Bu.	12.675c
Gross Processing Margin per Bu. Last Month	12.15c

Note: This scale is based upon soybeans with average moisture content of 14 percent or less (No. 2 yellow beans). For beans of higher moisture content allowances for shrinkage must be made. The values listed here are relative, and cannot correspond with your own transactions. Using your own figures, you can compute your own scale. This scale will show general trends.

STANDARD SHORTENING SHIPMENTS

(By Members of Institute of Shortening Mfgs., Inc.)

Week ending June 6	7,030,162 lbs.
Week ending June 13	8,223,974
Week ending June 20	7,137,793
Week ending June 27	8,505,161

Bean and meal prices advanced on the whole, for the first month since early in the winter. This was possibly due to a growing conviction that the government will take action to bolster meal prices. Meal buyers showed a tendency to stand by and await developments. The oil market weakened, with considerable trading under the ceiling, particularly the last two weeks before going to press.

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Too Much Rain -- Prospects Good

REPORTS from DIGEST correspondents on the July 1 soybean crop condition are generally encouraging despite excessive June rainfall throughout much of the Middle West from Michigan to Mississippi and Northeast Texas. Too much rain was reported from 11 states of the region, with Illinois and Missouri apparently suffering most.

United States Department of Agriculture reports indicate an increased national acreage this year of 42 percent, from 9,996,000 to 14,241,000 acres.

Contrary to a common impression prevailing in the soybean industry, reports from DIGEST correspondents do not indicate any large amount of the 1941 bean crop still remaining on farms. A little is reported in the heavier producing areas. Northeast Iowa reports 15 percent, Northwest Ohio 15 to 20 percent, but the general Ohio estimate is small, and in Illinois and Indiana only 2 to 5 percent is indicated. In Iowa, condition of beans remaining in storage is said to be poor, due to excessive moisture.

ILLINOIS

J. E. Johnson, Champaign: Planting date for east central Illinois two weeks late. Many soybeans planted after the 15th of June and a small acreage still to plant June 30. Other than being late, the general condition isn't bad. Water damage in low spots of many fields. Many thin stands and many weedy fields that are drilled solid. The early seeded beans are as good as we ever had. Too much emphasis has been placed on late planting to prevent weeds. Delayed planting with further delays from wet weather are very unfavorable. Think that last of May seedings should be encouraged rather than June seedings. On the well farmed fields the stands are excellent.

Frank S. Garwood, Stonington: Planting date was very late in Christian County, with a 10 per cent increase in acreage over 1941. The July 1 condition was perhaps 70 percent of normal. It has been so wet that many are just sowing. There are some pieces of early beans that look good but in general there are a lot of wet spots and weedy beans. There will be more beans sown in July than ever happened before.

Russell S. Davis, Clayton: Planting date a month late in west central Illinois, with the estimated acreage only 75 percent of last year. July 1 condition 50 percent of normal. Much too wet and many fields not yet planted. Many early planted fields are hopelessly weedy. On flat fields the beans are turning yellow and lower leaves falling off. Must have some sun soon if we have as many beans as 1941.

J. C. Hackleman, extension agronomist, Urbana: Fifty percent of crop planted at about normal date, 35 percent 2 to 3 weeks late, balance very late, some to be planted after July 4. Inability to plant because of continued rains or killing of beans in low spots may have cut down contemplated 35 percent increase in acreage for the state. Late planting, weedy beans, and some thin stands appear certain to reduce the yield. The large proportion of the crop planted in rows is being cleaned up very nicely. Many fields of drilled beans are grassy and turning yellow, some being disked up and reseeded.

INDIANA

J. B. Edmondson, Clayton: Beans planted May 28-30, two weeks later than normal, with some still being sowed June 30. A 25 to 30 percent increase in acreage over 1941. There was an extremely wet seeding season. Poor germination resulted in some thin stands. In most cases, however, heavier seeding was made to offset this. Germinating season ideal — hot with plenty of moisture. This condition accounted for many weak beans coming through satisfactorily.

Ersel Walley, Fort Wayne: Planting season in northeast Indiana and northwest Ohio about 5 days late, with an acreage increase of 15 to 30 percent. Condition spotted, but averages normal.

IOWA

E. S. Dyas, assistant extension agronomist, Ames: Planting date was normal, with a large increase in acreage and July 1 condition about 5 percent better than average. I am relying on general observation. I do not believe that the soybeans have been damaged by excessive rainfall to the extent that the corn has. This may be accounted for by the fact that more of the bottom ground that is subject to high water is normally put in corn. I have been surprised that the soybean fields are generally quite free of weeds.

Howard L. Roach, Plainfield: Crop 90 percent of normal northeast Iowa, with the acreage planted to beans up 35 percent. A heavy hay crop will leave more beans to be combined for seed.

John Sand, Marcus, Iowa: Prospects point toward a normal crop in northwest Iowa, with the acreage doubled. Many beans were replanted around June 10 due to hail. Too much rain in early June, but beans have done wonderfully well the past 10 days.

Leslie M. Carl, federal statistician, Des Moines: Acreage up 70 percent. It is likely that the state goal of 84 percent more soybeans harvested for beans will be met. The 1942 acreage is 352 percent above the 10-year 1930-39 average. Condition of the crop excellent except for small areas where water could not drain off.

OHIO

D. F. Beard, extension agronomist, Columbus: Later than normal planting, but fortunately so this year due to wet weather in early June making weed control difficult. An estimated increase of 200,000 acres or over 25 percent. Too much rain delayed planting, has hampered weed control in early planting, and drowned some out. Some fields were torn up and replanted late. Bean fields look as well, or better, than can be expected under the circumstances. Handicaps to date have not been serious or decisive as to final yield.

W. G. Weigle, manager The Marsh Foundation, Van Wert: Planting a week late, with some beans still being planted and replanted, with condition above normal. A detailed report of 46 farms picked at random in Van Wert County indicates 852.6 acres of beans as compared with 614.1 in 1941, or almost 40 percent increase. On this basis Van Wert County will have 50,000 acres in beans as compared with 36,000 in 1941.

G. G. McIlroy, Irwin, Ohio: More variation than usual in the planting date in Central and Northeastern Ohio, with a possible 50 percent increase in acreage. The July 1 condition was average to better than average.

WISCONSIN

George M. Briggs, University of Wisconsin, Madison: Planting date late with July 1 condition 85 percent of normal. Wisconsin acreage up 40 percent.

John P. Dries, director from Wisconsin, Saukville: Acreage increase of 20 percent in southeast and south-

(Continued on page 11)

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MANY PROBLEMS TO FACE CONVENTION

MAKE your plans now to attend the 22nd annual convention of the American Soybean Association, to be held at Purdue University in September. We know that travel at that time will be a bit more difficult than at the time of any previous convention in the history of the organization. We know that tires, gasoline, automobiles, common carriers and even manpower will be subject to more or less governmental rationing and control.

We know that ODT chairman Eastman has asked for the cancellation of conventions, fairs and public gatherings which involve travel. We know that many conventions have been called off for the duration.

But we also know that the problems facing the soybean industry are so acute and so manifold that the best minds of government and industry must of necessity be applied to them if they are to be solved. And even then the solutions will not be easily reached.

The producer of soybeans will have harvesting problems. If he is located in an area where combines are common, then he will have little difficulty. If located in the newer production areas it may be a difficult job to secure a combine to harvest the beans. And when harvested, where will he store the beans? Materials necessary to construct adequate storage facilities on the farm are being released. Terminal elevators and processing plants will only begin to hold the 1942 crop. The remainder must be stored at point of production.

The handler of soybeans will have his problems. Moisture may again be a factor, with a season which is somewhat behind normal. Adequate storage will be another. Interpretation of the new moisture standards will be another. Buying and selling on a governmentally stabilized price basis will be another.

The processor of soybeans will be attempting to buy beans on the basis of governmentally stabilized prices, and to do an economical job of processing which will enable him to sell his two products within the Price Ceiling regulations and still show a profit. Storage of beans, oil and meal will be problems to him. Finding a market for the meal will be another — and an important one. Maintenance of the mechanical condition of his plant to permit 365 day operation will be important.

These problems offer a challenge to the convention. They will receive attention. And in addition to them there will be enlightening discussions of new usages, new research, new ideas. New faces will be present. The old familiar ones will also be there.

PUT THE AMERICAN SOYBEAN ASSOCIATION CONVENTION DOWN AS A **MUST** ON YOUR CALENDAR. It will be held at Purdue University on SEPTEMBER 16 and 17.

THAT soybeans are being grown in an ever-increasing range of soil, weather and moisture conditions is well demonstrated by the story on the production experiments in the Valley section of Texas. You will want to watch the South during coming years — for soybeans are going to become increasingly important there.

NEXT month we will carry a rather complete description of the grade changes in the Federal standards. The shift to the air oven method of official determinations will mean a difference, on a moisture basis, in the dividing line between grades. Elevator operators using Tagg-Hempenstahl and other electrical testers will want to secure new calibration tables before the 1942 bean purchase season begins. They may find themselves buying No. 2 beans and selling them as No. 3's if the correct calibrations are not used. After last year's experiences with high-moisture beans, with the present crop apparently behind normal schedules, and with beans destined to sell at or above the $1.60 mark, accurate moisture testing is essential.

THE public hearing between soybean processors and Commodity Credit Corporation representatives was held in Chicago June 15 as scheduled, and was presided over by President J. B. Hutson of the CCC. At this writing no definite decision has been announced concerning conditions under which the soybean crop will be processed and sold, although it was expected that some announcement would be made shortly after July 1.

The government is trying to make certain of maximum production by all processing facilities, and the CCC for some months has been studying a means of assuring a proper price spread for the mills, who claim that the return from soybean oilmeal and the oil, covered by a government price ceiling, has not justified the recent prices paid for beans. It is assumed that the final solution will be found within ceilings already set and the guaranteed base price of $1.60 per bushel to the farmer.

THE SOYBEAN DIGEST will carry the complete story when a decision is reached.

★ FEEDS ★

SOY MEAL IN PIG DIET Soybean meal may safely be used to replace the usual tankage or meat scraps in summer rations for early spring pigs, according to E. T. Robbins, extension livestock specialist of the University of Illinois College of Agriculture.

Soybean meal does not produce soft pork as do the unprocessed soybeans. Even when it has been the sole source of supplementary protein in rations for pigs from weaning to marketing, soybean meal protein has proved equal to tankage protein.

In summer when pigs are on pasture, there is very little likelihood of a mineral deficiency in the diet of the soybean - meal - fed pigs, provided they are fed additional minerals.

When a ton of tankage costs more than 1-1/3 times as much as a ton of soybean meal, these tests suggest that the meal might profitably replace all the tankage. In other words, so long as soybean meal costs less than three-fourths the price of tankage, it is likely to prove cheaper than tankage as a supplement to corn for growing-fattening pigs.

In Poultry Ration

Substitution of soybean oilmeal for dried milks and for at least half of the feeds of animal origin in the poultry ration as a wartime economy measure is recommended by the National Research Council of Washington, D. C.

To quote the council's suggestions with reference to soybean meal:

Dried milks have been largely used in poultry rations to furnish riboflavin and associated factors. Because of their high price and unavailability due to the diversion of large amounts of whole and skimmed milk to human needs, substitutions should be made where possible in the interest of economy.

These substitutions should be made on the basis of supplying as nearly as possible the equivalent protein and vitamin values previously furnished by the dried milk. The difference in protein between the amount present in milk and that supplied by the substitute can be furnished by adding additional protein concentrates, such as fish meal, meat scraps, or soybean oilmeal.

The quality of the protein is of fundamental importance in poultry rations. It is necessary to use some feeds of animal origin, such as meat scraps and fish meal. One-half of the protein, other than that furnished by the cereals, can come from vegetable sources like soybean oilmeal or peanut meal. Under some conditions, even larger quantities of the vegetable protein concentrates can be utilized, particularly soybean oilmeal.

Lifesaver to Poultrymen

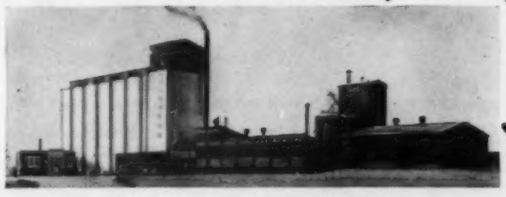
The increased production of soybeans and the resulting increased supply of soybean oil meal will be a lifesaver for the poultryman, Dr. R. W. Bethke of the Ohio Agricultural Experiment Station, told poultrymen at an annual field day at the station June 24.

Dr. Bethke said that reduced amounts of fish meal and possibly meat scrap and milk might otherwise cause a real protein concentrate shortage.

Experiments indicate that soybean oil meal can be used safely to replace at least 80 percent of the animal protein in the poultry ration, according to Dr. Bethke.

FOSTORIA, OHIO

DES MOINES, IOWA



CHAMPAIGN, ILLINOIS

CAIRO, ILLINOIS

The new increase in soybean production, and the new importance of soybean crops, have their own special significance to every soybean producer. Swift & Company's 4 conveniently located soybean mills are thoroughly keyed to progressive developments in production and marketing. Discussion of individual problems is welcomed. The Swift mill nearest you is a sound, practical outlet—and a source of helpful information and advice. Visit it soon.

SWIFT & COMPANY

Soybean Protein

By ALLAN K. SMITH

U. S. Regional Soybean Industrial Products Laboratory*, Urbana, Illinois

THE large quantities of soybean meal left from the solvent extraction of oil from soybeans may be considered as a practically unlimited raw material for the production of soybean protein. If 10 percent of the 1941 crop of soybeans, estimated at 107 million bushels, were processed for protein, we would have approximately a quarter of a billion pounds of this product. It is thus evident that raw material supplies are more than adequate for all visible needs.

Soybean protein is a relatively new commodity on our markets, and in order to find a permanent place among other competing industrial proteins, synthetic adhesives, and plastics, it must meet competition in regard to both quality and cost. It is not possible at this early stage of development to present trustworthy data relative to the cost of refining soybean protein. As regards cost of materials, however, the situation is very promising. If we take the value of solvent-extracted, oil-free meal in normal times at 1½ cents per pound and the protein content as 44 percent, we have an initial cost of unrefined protein of about 3.4 cents per pound, ascribing no value to the nonprotein fraction of the meal. On this basis a liberal allowance can be made for processing costs and still there will remain a satisfactory price range to compete with other proteins which normally sell for 12 to 16 cents per pound.

Extensive Investigation

The U. S. Regional Soybean Industrial Products Laboratory has made an extensive laboratory investigation of methods for separating the protein from the meal and is continuing these studies along with research on chemical and physical properties of the protein. The results obtained show that the separation of the unmodified protein on a small scale by extraction of the meal with water or dilute alkali and subsequent precipitation with acid is not difficult. Extraction data for acids, bases, and salts are illustrated in Figures 1 and 2. On the other hand, the engineering problems such as clarification, filtration, centrifugation, drying, and grinding which are encountered at various stages of large-scale production are not well understood and might offer considerable difficulty to anyone undertaking commercial production.

There is also the problem of modifying the properties of soybean protein by chemical treatment to make it suitable for specific uses. This problem deserves a great deal of scientific investigation, and its solution will be the principal means of extending the industrial utilization of soybean protein and probably other proteins as well.

Soybean protein is comparatively new in the field of industrial proteins, which include casein, gelatin, blood albumin, egg white, fish glue, and zein. These proteins have various physical and chemical characteristics in common, yet each one possesses an individuality which leads to some specific use. Proteins have the most complicated molecular structures of any substances with which the chemist works, and for this reason truly chemical exploitation will be slow.

Soybean protein resembles casein more closely than any other protein, and in the early attempts to intro-

*A cooperative organization participated in by the Bureaus of Agricultural Chemistry and Engineering and Plant Industry of the U. S. Department of Agriculture, and the Agricultural Experiment Stations of the North Central States of Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

Figure 1. The solubility of soybean protein in various salts and in water. For carefully prepared soybean meal the water disperses more protein than the salts up to 2 normal concentration. These data are based on the total nitrogen in the meal.

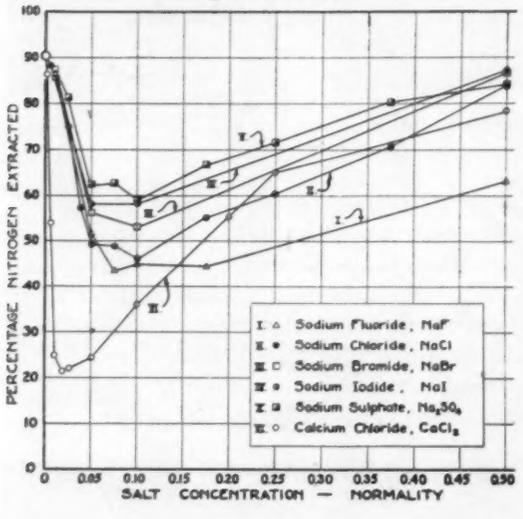
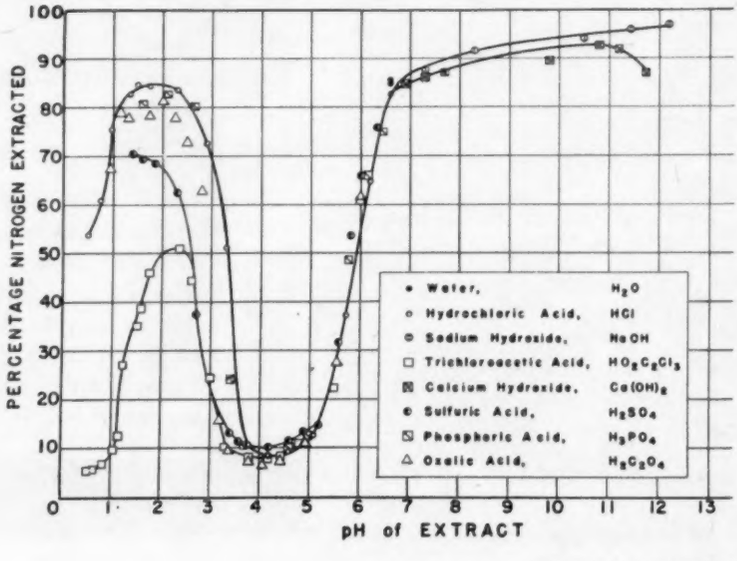

PERCENTAGE NITROGEN EXTRACTED
SALT CONCENTRATION — NORMALITY
I △ Sodium Fluoride, NaF
II ● Sodium Chloride, NaCl
III □ Sodium Bromide, NaBr
IV ⊘ Sodium Iodide, NaI
V ⊠ Sodium Sulphate, Na_2SO_4
VI ○ Calcium Chloride, $CaCl_2$

Figure 2. The solubility of soybean protein in alkalies and acids. The pH value of 6.6 is for distilled water. Higher pH values are obtained by adding alkalies and lower pH values by adding acids. These data are based on the total nitrogen in the meal.



Soy Products Fill Gaps in the Paper and Plywood Industries as War Shortage of Casein Develops

duce it to industry it was called "soybean casein" with the object of trading on the good name of an already established product. In the long run, however, soybean protein must find its place in industry on its own merits, and any attempt to confuse it with casein or other protein cannot be considered a sound policy.

Industrial Use

While the isolation of soybean protein on a small scale is a relatively simple matter for a chemist, it should be pointed out that its production on a large scale and its utilization by industry require considerable technical skill and will result in disappointment to those attempting commercial processing without a careful study of the problems involved. Furthermore, when soybean protein is recommended for certain uses, one should not expect that it can be substituted in formulas established for other proteins with the same results, but rather that specific or modified formulas will be required. It should be considered as a technical product and sold accordingly.

As intimated above, soybean protein may be modified during the refining process so as to alter its solubility or dispersing characteristics, its adhesive strength, viscosity, color, and tolerance for formaldehyde. The simplest modifications are effected by a mild hydrolytic treatment with dilute alkali or by the action of proteolytic enzymes. These treatments alter several of the properties of soybean protein; for example, they make it more easily dispersible. Research is in progress on the substitution of organic groups in the protein molecule, because an appreciable change in physical and chemical properties may be expected from this type of chemical alteration.

In Paper Industry

Indications are that soybean protein will find substantial use in paper coatings, paper sizing, water paints, plastics for buttons and buckles, leather dressings, and adhesives for various purposes, such as making furniture and abrasive paper. Research is in progress toward the production of a wool-like fiber from soybean protein. Such a project, if successful, might consume a considerable tonnage of the protein.

The largest use of soybean protein

ALLAN K. SMITH

in immediate prospect is for paper coating. Up to the present time soybean protein has not been completely acceptable for all grades of paper coatings, largely because it is slightly darker in color than casein. Recent work at the Soybean Laboratory indicates that a satisfactory bleach for soybean protein may have been found in sodium dithionite ($Na_2S_2O_4$) or zinc dithionite (ZnS_2O_4). It has been shown in the laboratory that 4 or 5 percent of one of these powerful reducing agents on the basis of the protein, added at the time of preparing the coating color results in a paper coating as bright in color as that prepared with a good grade of casein. This bleaching development is still to be proved satisfactory in plant production and printing tests, but the simplicity of operation favors its success. Since the beginning of the war emergency, much of the normal casein supply has been diverted to dry milk production, and we have an increasing shortage of milk casein. Commercial soybean protein which has been developed to the stage where it may satisfactorily take the place of casein in the paper trade can help to fill in this shortage.

Perhaps more important in the present emergency than paper coating, however, is that portion of the plywood industry which depends upon casein as an adhesive and which consumes an estimated 200 tons of casein per month. An increased production of soybean protein would help to relieve the general industrial protein demand and aid in this essential war need.

It is impossible to predict at this early stage of research and development what the future may be for soybean protein as an industrial product, but with all things considered it has many promising possibilities.

✶ RESEARCH ✶

REGIONAL LAB MOVED The chemical research division, one of two departments of the Regional Soybean Industrial Products Laboratory at Urbana, Ill., is being moved to the new Northern Research Laboratory at Peoria, it has been definitely decided.

Action for the removal from the University of Illinois has been approved by Congress and funds have been granted to make an immediate change.

The breeding and culture division, representing the agronomic phase of the U. S. D. A. experiments, is to remain at its present location with its field of work greatly expanded.

Splitting the two divisions of the Laboratory follows the recommendations of Dr. Orville E. May, recently named research coordinator of the staff of the Agricultural Research Administrator and who organized the Laboratory set up on the University campus and served as its director from 1936 to 1938.

"The program devoted to breeding and analytical work on soybeans to be done here is going to be much better than in the past," says Professor W. L. Burlison, head of the University department of agronomy. "We think a fine laboratory will be worked out here. This all will be under the bureau of plant industry.

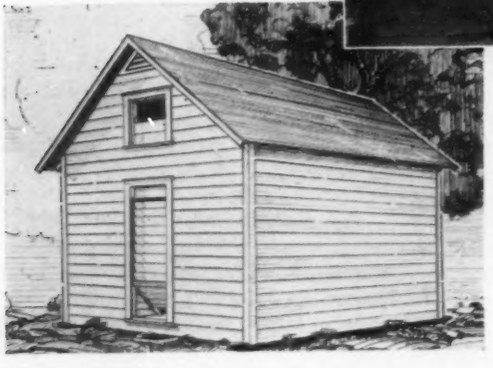
"The work to be moved to Peoria will be devoted to the study of utilization of the oil, with all aspects of the chemical phases considered."

—Courtesy Douglas Fir Plywood Association.

An all-plywood bin, erected at Iowa State College, Ames. This bin, of 1,400 bushel capacity, is 12x16x8 feet. Basic feature of this design is the utilization of tie rods in both sections to give added strength to the walls. It took just 35 minutes to lay and nail the complete floor of this bin.

—Courtesy Douglas Fir Plywood Assn.

(Right) Putting up an all-plywood circular type of grain bin at the Fort Hays, Kans., Experiment Station. A farmer with three helpers can erect this bin, but seven or eight men can do the job better. Everything is of plywood, from the roof to doors and floor, which in this case is laid on joists over concrete foundation walls. This type will stand great stress, holds 1,000 bushels.



Courtesy O'Neil Lumber Co., East St. Louis.

(Left) A wood-frame bin that can be either movable or stationary. The extension service of the University of Illinois College of Agriculture at Urbana has plans for bins of this type that will hold from 500 to several thousand bushels, and most of them can be built for well under $1,000. This bin later can be converted into garage or poultry house, if desired. Write for Plans 732-11, 732-12 for movable bins, and 732-13 for stationary bin.

Temporary storage made from composition wood and waterproof paper cap which is covered with poultry netting held in place with weights. This is placed on a raised floor constructed with joists and flooring, is not recommended for beans of high moisture content. For details contact Masonite dealer or write Masonite Corporation, 111 W. Washington Street, Chicago, Ill.

THE SOYBE

And What Are We Going to Do About It?

WHAT are we going to do with the 1942 soybean crop? If there is more than one answer to that question, your editors have not heard about it. The coming crop will be kept on the farm. There is no other place for it to go.

A record carryover of 630 million bushels of wheat is one reason storage space is short. Another is a greatly increased acreage of soybeans. A third is the burden of war goods on the railroads. In the past, grain men have used railway cars for storage. They can't do that this year. The Association of American Railroads recently placed an embargo, except by permit, on grain being shipped to any market for storage this summer and fall.

Bird's-Eye View

In some sections the wheat crop will be crowding all existing storage facilities before the soys come on.

Here is a bird's-eye view of the situation in a few states:

In Kansas, commercial storage can handle about one-tenth of the wheat crop. In Ohio, total storage space would not accommodate the soybean crop, if there were no wheat crop and all oats and barley were fed on the farm.

Indiana reports that the bulk of the small grain will have to be stored on the farm, with over half of commercial storage space filled at the beginning of the season. In Iowa some forecasters say the soybean crop will be larger than anticipated with storage facilities for about 20 million bushels of small grain.

This storage problem is one of the war babies that have been left on the farmer's doorstep. He can't run away from it or ignore it.

Use Vacant Buildings

Cribs, bins, stalls, silos, garages, and even unoccupied buildings in town may be used if they can be made grain tight, and water, chicken, bird and rat proof. Pole frames, wire or snow fence walls, lined with paper are not recommended — not with soybeans at $1.60 a bushel!

Beans of high moisture content will constitute a special problem, as they

STORAGE PROBLEM

likely will have to be dried on the farm. Storing in a floored-in driveway in the barn is suggested, where wet beans may be turned and air-dried. Perhaps some neighborhoods can pool grain that needs drying, and conserve labor.

Steel bins, except for used ones, are out for the duration. Fortunately, the lumber shortage is not yet acute. Plywood and wood composition are available. Cheap, adequate bins made of these materials have been designed. The materials entering into concrete are plentiful.

WPB Lifts Restrictions

Recently WPB loosened restrictions on wooden grain bins, providing they contain little metal, so companies that manufacture the prefabricated type may go ahead and prepare this equipment.

WPB also allows farmers (as of April 9) to construct bins costing up to $1,000 without special permit. It has been suggested that the use of unskilled labor and rough lumber from the farm woodlot might help to keep the cost under the maximum.

The following essentials for temporary storage are suggested by the extension service, Purdue University:

1. Foundations, floors, and walls strong enough to withstand the outward and downward pressures of the grain.
2. Protection for the grain from all sources of moisture, such as rain, dew, snow, ground water, and condensation.
3. Tight, smooth walls to permit sanitation and effective fumigation for destruction of grain-damaging insects.
4. Adequate barriers to prevent damage to grain by rodents, birds, farm livestock and other thieves.

Suggested Sources

For further information on emergency soybean storage, the following extension services and firms are suggested:

Agricultural Experiment Station, University of Illinois College of Agriculture, Urbana, plans for movable and stationary grain storage, and circular 529.

Department of Agricultural Engineering, Kansas State College, Manhattan, plans for plywood bins.

Agricultural Extension Service, Lafayette, Ind., circular on temporary grain storage.

Masonite Corporation, 111 W. Washington Street, Chicago, temporary composition wood structure.

Johns Manville, 31 East Georgia Street, Indianapolis, Ind.

Homosite Company, Trenton, N. J.

The Sisalkraft Company, 205 West Wacker Drive, Chicago.

G. F. Manufacturing Company, Exira, Iowa, prefabricated bins.

Portland Cement Association, Hubbell Bldg., Des Moines, Iowa, or your nearest Portland Cement dealer for design of emergency concrete grain storage.

United States Department of Agriculture, Washington, D. C., bulletins 1636 and AAA G-106, Farm Bulk Storage for Small Grains, and Wheat Storage on the Farm.

Extension Service, Iowa State College, Ames, Iowa, A. E. 66, List of Farm Building Plans.

—s b d—

LEND-LEASE BUYS SOY SAUCE

For the first time, in May, the Agricultural Marketing Administration of the U. S. Department of Agriculture included soy sauce in its lend-lease purchases for shipment abroad.

Total farm products bought by the administration during May were valued at $154,404,000. This brings the total value of farm products bought under lend-lease to over 1¼ billion dollars.

Three hundred and twelve cases of the soy sauce, worth $1,702, were bought in May.

Other soybean products bought since the lend-lease program was initiated in March 1941 include:

	Cumulative Quantity	Cumulative F.O.B. Cost
Soybeans	26,980,000 lbs.	$ 830,479
Soybean Pellets	5,840,000 lbs.	167,243
Soy Grits	120,000 lbs.	6,432
Soy Flour	20,290,000 lbs.	1,166,396
Total	53,230,000 lbs.	2,170,550

* * * * * *

CENTRAL SOYA PROMOTES

DALE W. McMILLEN, Jr.

WILLIAM C. SCOTT

The McMillen Feed Mills, Fort Wayne, and its parent company, the Central Soya Company have announced two appointments designed, according to officials, to perfect a "closer knit, more efficient organization."

Dale W. McMillen, Jr., who is now executive vice-president of Central Soya, has been named sales manager for the McMillen Feed Mills division. He will retain his executive post with Central Soya.

William C. Scott, of Detroit, has been appointed director of merchandising and market research, for both companies.

Mr. McMillen is the son of the founder of Central Soya and the McMillen Feed Mills. He is a graduate of Northwestern University, where he majored in business administration, and received his degree in 1936. He joined the Central Sugar Company, Decatur, immediately after graduation, and served here in every department, before transferring to Central Soya, in 1939.

Mr. Scott is a graduate mechanical engineer, having received his degree from the University of Michigan. He has served as business consultant with several nationally known organizations.

Offutt Elected

Harry C. Offutt, of Fort Wayne, has been elected vice-president in charge of production of the Central Soya Company and its subsidiary, the McMillen Feed Mills. Mr. Offutt has been a construction engineer for thirty years, and president of the Indiana Engineering and Construction Company since it was organized, in 1914. He resigned that position to accept the McMillen post. He will maintain a close connection with the construction company as chairman of the board of directors. Mr. Offutt has been consulting engineer and member of the board of directors of Central Soya, since it was formed in 1934.

Soy Oil In Rubber Substitute

ALTHOUGH chemistry's efforts to meet the rubber shortage center mainly on producing a synthetic product from such large-scale raw materials as grain and petroleum, the Department of Agriculture also is working on so-called rubber substitutes and rubber extenders. Substitutes would be useful for many products that do not have such huge and exacting requirements as tire manufacturing. Extenders could be mixed with natural rubber to reduce the amount of the latter required.

At the Northern Regional Research Laboratory of the Bureau of Agricultural Chemistry and Engineering, at Peoria, Ill., chemists working with such farm products as soybean oil and corn oil have produced materials that look, smell, and feel much like natural rubber.

Some of these products will stretch 200 percent or more and return to their original forms, and show tensile strengths of approximately 500 pounds per square inch. The general run of natural rubber has a 600 percent stretch, and a tensile strength of 3,000 pounds or more.

But a substitute that is only a fraction as strong and elastic is entitled to be called promising for some pur-

(Continued on page 11)

In a search for rubber substitutes which have less exacting requirements than tires, and for rubber extenders that can be mixed with natural rubber to make it go further, chemists of the U. S. Department of Agriculture have produced a rubber-like substance from vegetable oils that looks promising. It has passed the laboratory tests successfully, and is now being tested in the pilot plant under semi-commercial conditions. If these tests give the results expected, it will be subjected to commercial trials.

(Top) A rubber substitute being milled from soybean oil at the Department's Northern Regional Research Laboratory at Peoria, Ill., is tested for elasticity.

(Center) Here chemist John C. Cowen (right) and an associate stationed at the Peoria Laboratory are milling a rubber-like material from soybean oil.

(Bottom) Cowen and his helper test the stretch of a rubber substitute made from soybean oil. The substitute looks and feels like real rubber and has a 200 percent stretch as compared with a 600 percent stretch of real rubber.

— U. S. D. A. Photographs by Forsythe

SOYBEANS ON THE RIO GRANDE

By K. F. MANKE and W. H. FRIEND
Texas Agricultural Experiment Station

W. H. Friend, superintendent of the soybean test at Texas Experiment Station Substation No. 15 at Weslaco, Texas.

DURING the past two years, the Texas Agricultural Experiment Station has been investigating the possibilities of growing soybeans from fall plantings at Weslaco, in the irrigated section of the Lower Rio Grande Valley. The preliminary results, which have been obtained, seem to point to the desirability of considerable acreage being devoted to soybean seed production in this section, particularly while the market outlook is favorable.

In 1941 experiments, 167 varieties and strains of soybeans were included. Of these, only nine were tested in replicated plots, the remainder being grown in single unreplicated nursery rows. The 1941 seed yields of the nine in the replicated planting are given in Table I.

TABLE I.

Yields of seed of nine varieties of soybeans grown from Sept. 15 planting at Weslaco, Texas.

Variety	Yield
	Bu. per acre
Manchu	19.3
Illini	17.9
Macoupin	33.2
Wood's Extra Early Yellow	30.1
Scioto	28.4
Dunfield	28.2
S.P.I. 89769	32.4
S.P.I. 89773	20.1
S.P.I. 88784-1-1	30.7

Many Varieties Tried

In the unreplicated nursery trial, most of the commercial varieties available in the United States were included. Many lesser known varieties and many un-named strains, made available through the courtesy of the Division of Forage Crops and Diseases of the U. S. Department of Agriculture and other agencies, were also grown. The yield data obtained from these single row plots are subject to considerable error but they are presented to show the range of yielding capacity. The frequency distribution of the 167 varieties and strains by classes of five bushel intervals, is shown in Table II.

TABLE II.

Frequency distribution of yields of 167 varieties and strains of soybeans planted without replication Sept. 15, 1941 at Weslaco, Texas.

Yield Class	No. of Strains	Yield Class	No. of Strains
Bu. per acre		Bu. per acre	
0.0.-5.0	0	25.1-30.0	34
5.1-10.0	1	30.1-35.0	43
10.1-15.0	11	35.1-40.0	14
15.1-20.0	23	40.1-45.0	8
20.1-25.0	33		

During the course of these investigations it has been possible to observe, under actual field conditions, the responses of soybeans to length of day, factors that have been so frequently referred to in the literature. It appears, from these results, that the soybean is fundamentally a short-day plant, but that the numerous varieties differ in respect to their tolerance of long days in the matter of initiating flowers and fruits. Most soybeans grown in the Northern Hemisphere are planted in spring or early summer. Under these conditions, the varieties are easily classified according to their photoperiodic requirements for fruiting.

Types commonly referred to as "southern varieties" require short days to set fruit, while the so-called "northern varieties" tolerate long days. In the Weslaco trials, these so-called regional types were planted side by side September 15, 1941. They behaved, not unlike in their fruiting habits, but on the contrary, very much alike. Furthermore, in regard to time required for maturity, they behaved very similarly, all of them ripening in from 80 to 90 days after planting. Ordinarily, September planted soys would ripen before the average date of the first killing frost in this southern area.

Plant in September

From a practical standpoint, it would seem that if the responses obtained in the experimental plots can be duplicated on a field scale it will be possible to bring considerable acreage into soybean seed production in the Valley in the fall of 1942.

Cotton is ordinarily harvested in August in this region and could be followed by September planted soybeans, which would, in turn, be harvested before the end of the year. This would leave plenty of time for the land to be prepared for cotton or corn the following year, or for spring vegetables, such as tomatoes or potatoes.

It has been suggested that soybeans be planted around September 1-15 on low beds 18 inches apart at a rather heavy rate of seeding, from 80 to 100 pounds per acre. Uniform, rapid emergence can be assured by irrigating immediately following planting. Inoculation is considered essential. There is considerable cultivating, harvesting, and crushing equipment available in the Valley for handling a large production of soybeans.

The storage of planting seed is a problem which must be given serious consideration in the area because of the hot, humid conditions under which the seed must be held between harvest and planting. Special precautions to maintain seed supplies of satisfactory germinating ability undoubtedly should be taken.

—s b d—

Soybeans are supplying the oil that cosmetic firms are now substituting for cocoanut oil. Although shampoo compounds and shaving creams won't lather quite so much as in the past, otherwise the customer will never know that the chemist has switched him from a cocoanut to a soybean base, says Chemurgic Digest.

SOYBEANS . . . *and People*

SOMETIME in the next month or six weeks folks who planted their edible soybeans early in May in the Middlewest will begin to serve this vitamin- and mineral-rich green vegetable on their tables.

They will be pioneers, for the broad trail of soybeans in the American diet is still to be blazed.

But here are a few pointers from college research workers and others on handling and eating the green soys:

Most people find it desirable to pick the pods before they are quite full. However, the University of Illinois Agricultural Experiment Station reports the beans to be acceptable even after they have begun to turn yellow.

If you are picking only a small number for the table, save backache and sunburn by pulling up the plants and taking them to a seat in a shady spot to pick off the pods.

The labor of shelling has caused most of the burden of complaint against the green beans. The most acceptable method seems to be to cover the pods with boiling water and to parboil for 3 to 5 minutes, then drain and chill with cold water. Hold scalded pods between thumbs and forefingers with longer side up and snap in two pieces, squeezing the beans out of each piece. (Limas may be prepared the same way to advantage.)

But some wise housewives dodge this task entirely by "going oriental." They serve the beans in the pod. They wash the beans thoroughly to remove all dirt from the fuzzy surface of the pod, then boil until beans are tender in the pods. These are to be eaten from fingers after dipping in melted butter seasoned with soy sauce. This feat is no more messy than eating corn on the cob, and adds that leisurely Chinese touch.

Otherwise, green soybeans may be prepared about as limas or green peas, plunging them into the kettle as soon after picking as possible. Anna Margrethe Olsen at Iowa State College recommends covering with cold water lightly salted and cooking for 12 minutes, then draining and seasoning only with salt and pepper, and serving hot. Since soys are high in fat, they need little butter. She suggests that housewives can make a start at using the green beans by substituting them for peas in various recipes.

Vegetable soybean is a rich food. Serve in small portions. Use it to fortify other foods, or as an excellent addition to soups, chili, and salads. It will "up" the nutritive value of these dishes. Try mixing green soys with corn for succotash, or, cold, in vegetable salads.

Try Soy Scallops

Here are two suggested recipes for green soy scallops:

SCALLOPED GREEN SOYBEANS

Mix cooked green beans with tomato or white sauce, cover with buttered bread crumbs, and bake in moderate oven until the beans are heated through and the crumbs are brown.

SCALLOPED GREEN SOYBEANS

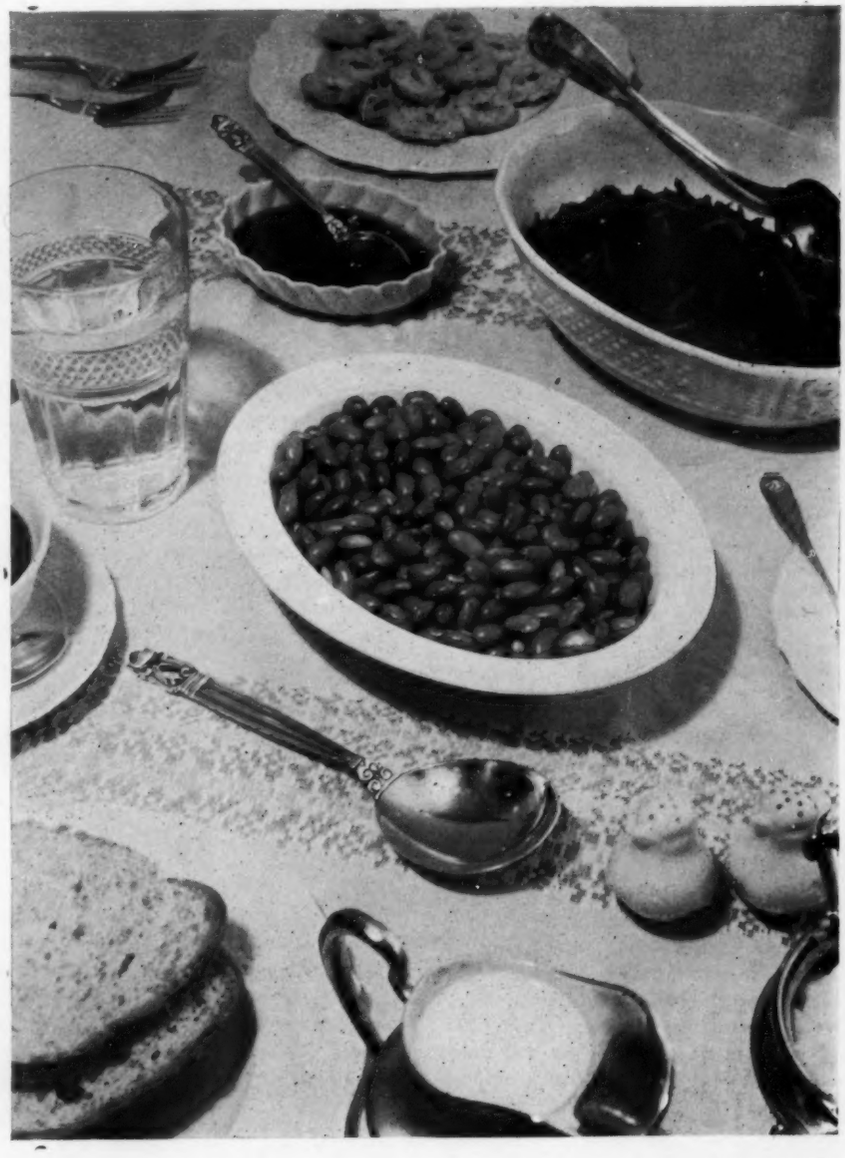
3 cups cooked green soybeans
3 cups milk
6 tbsp. fat
6 tbsp. flour
1 tsp. salt
1 cup breadcrumbs

Heat the milk, fat and flour. Add the beans and other ingredients except the crumbs. Put into a baking dish and cover with the bread crumbs and bake until brown.

—s b d—

Buy your share of Victory this week. Victory is cheaper than defeat.

Dark green beans make a colorful and attractive center for this meal spread. — Photo courtesy Farm Science Reporter.



CROP PROSPECTS

(Continued from page 1)

west Wisconsin, with planting date 2 to 3 weeks late, as rain halted planting operations. Crop had ideal conditions for first 2 weeks of growth.

MINNESOTA

W. G. Green, Lakefield: Acreage up 1,000 percent in southwest Minnesota. Too much rain here, with planting 1 to 4 weeks late.

Farmers Seed & Nursery Co., Faribault: Acreage increased 50 percent. Planting 2 weeks late, with July 1 condition 50 percent of normal in south central Minnesota.

MISSOURI

J. Ross Fleetwood, extension specialist field crops, Columbia: Nearly 50 percent acreage increase in Missouri. Planting date 10 days to 2 weeks late. Flood waters have destroyed an unknown acreage, and an unknown acreage will be planted to beans after the waters recede. Our final acreage is in the balance now.

TEXAS

Harold R. Walker, associate agricultural statistician, Austin: Texas acreage nearly three times that of 1941 and extending into new sections. Excessive rainfall in north and east made planting date there slightly later. Late June conditions have rectified most difficulties.

MISSISSIPPI

L. I. Jones, director of extension, State College: Estimated planted acreage for the state is 282,000 as compared with 71,000 in 1941. Planting was 10 to 15 days late. Too little rain early, too much rain recently. July 1 condition 10 percent below normal due to grass, and labor shortage.

P. W. Gull, agronomist, Stoneville: Planting in the Yazoo-Mississippi Delta was 2 to 3 weeks late, due to cold, wet weather in April and May. Acreage planted approximately the same as in 1941. However, it is estimated that only 25 percent of the 1941 acreage was harvested. With favorable weather conditions the Delta area can easily meet their quota of harvested beans.

MICHIGAN

V. H. Church, senior agricultural statistician, Lansing: March 1 inquiry indicated an increase of 55 percent in acreage over 1941 in Michigan, a total of 225,000 acres this year. There has been an excessive amount of rainfall during May and June. The fields are weedy and grassy, particularly in the heavy land sections.

NEW YORK

Oswego Products Corp., Oswego: Acreage up 500 percent. Planting 10 days late due to wet weather, but too little rain as of July 1.

KANSAS

E. A. Cleavinger, extension agronomist, Manhattan: Planting date delayed 10 days with above normal rainfall for June. Growing conditions normal but weeds hard to control. Estimated acreage 585,000 as compared with 109,000 in 1941.

SOUTH CAROLINA

H. A. Woodle, extension agronomist, Clemson: Normal planting date with a slight increase in acreage. July 1 condition 80 percent. Soybeans have not been grown for crushing purposes in South Carolina. May be a few crushed this year.

RHODE ISLAND

R. S. Shaw, Extension agronomist, Kingston: Planting date normal with an increase of 10 percent in acreage. Rainfall light. Soybeans are grown only for hay and silage in Rhode Island.

WEST VIRGINIA

R. J. Friant, extension agronomist, Morgantown: Planting 10 days late, with 15 percent acreage increase. Rainfall normal. This is purely an estimate.

MARYLAND

Albin O. Kuhn, assistant extension agronomist, College Park: A 40 percent increase in acreage, making between 95,000 and 100,000 acres for all purposes. Adequate rain, excellent prospects for a good crop.

VIRGINIA

W. H. Byrne, agronomist, Blacksburg: Planting 1 to 2 weeks late, with about 45,000 acres increase. Rainfall spotted.

NEW JERSEY

H. R. Cox and C. S. Garrison, extension agronomists, New Brunswick: Planting date normal with rainfall very favorable. Acreage planted this year about 50,000 as compared with 35,000 in 1941, but since only 8,000 acres were grown for grain and seed in 1941, there will be about 150 percent increase for that purpose this year.

ARKANSAS

Jacob Hartz, Stuttgart: Planting late on account of rain, and still going on. Crop is late and grassy in parts of state due to too much rain. A 40 to 50 percent increase in acreage.

KENTUCKY

E. J. Kinney, agronomist, Lexington: Planting 1 week late, with 50 per cent increase in acreage. July 1 condition good. There has been a tendency in Kentucky in late years to plant soybeans later than formerly. Just why I don't know unless it is to avoid competition in labor demands.

—s b d—

SOY OIL IN SUBSTITUTE

(Continued from page 8)

poses, say Bureau chemists and engineers. There are other important qualities than stretch and tensile strength — their importance depending upon the intended use. Some of these other qualities are resistance to abrasion, cracking, oxidation, heat, and the effects of light and chemicals.

Most of the work so far has been only on a laboratory scale, but some of it is being tested in the pilot plant. If this proves satisfactory, the next step would be commercial trials.

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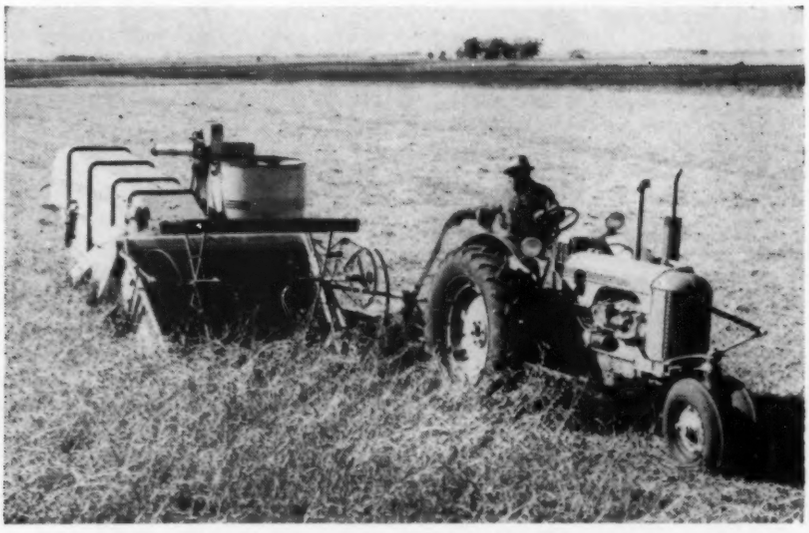


There are enough combines for the work at hand. But they will have to be the right place at the right time.

★ GROWERS ★

COMBINE JIGSAW Soybean growers have a giant jigsaw puzzle to piece together this fall — when they begin to match existing combines to the nation's soybean crop.

Statisticians tell us this puzzle can be worked. There are enough combines to do the unprecedented job ahead. It is largely a matter of getting the combines to the right places at the right time. But it will take careful planning and a heap of cooperation.

Iowa is an example of the way the jigsaw will have to be pieced together. Here the estimated bean acreage is 1,777,243, the available combines 11,278. If the figures are correct, each combine in the state will have to harvest almost 158 acres. That would not seem to be an impossible feat.

But the big soybean section is north and central Iowa, while many combines are concentrated in the wheat areas along the southwestern and southeastern borders. In many of the northern counties a real shortage of machines exists. For instance, Howard County has planted almost 500 acres per combine! Thirty-three north Iowa counties will have to harvest more than 200 acres per combine if they rely on existing machines, the U. S. D. A. War Board reveals.

The War Board hopes to meet this problem in Iowa by (1) allocating the available new combines to counties in critical areas, (2) selling combines to individuals for custom harvesting. The board also hopes to encourage a "lend-lease" program, in other words, a free exchange of farm machinery among neighbors to relieve shortages.

Presumably, other states may work out similar plans. A recent Illinois survey indicates a shortage in western and northwestern livestock sections, but plenty of equipment in the winter wheat belt. Combines in the former area may have to harvest 160 to 175 acres each this year, says J. C. Hackleman, crops extension specialist.

In Ohio there are an estimated 10,000 combines for 900,000 acres. This would appear to be enough.

U. S. TO IMPORT FOREIGN OIL?

South and Central America are being looked upon by the United States as promising sources of vegetable fats and oils, Dr. K. S. Markley, of the U. S. Department of Agriculture, said in an address for the Second Inter-American Conference of Agriculture, at Mexico City, July 6-16.

The favorable position of Latin America, Dr. Markley said, may be attributed to the fact that these countries normally export considerable quantities of oils and oilseeds, including flaxseed, castor seed, oiticica oil, babassu kernels and carnauba wax.

Dr. Markley grouped United States needs for oilseeds of Latin American origin under edible oils, soap oils, drying oils, and miscellaneous specialty oils and waxes.

"If increased quantities of edible fats and oils need to be imported," he said, "it is probable that they will consist principally of cottonseed oil and tallow. Brazil and Argentina, respectively, would probably be in the best position to supply these products."

The individual farmer, as his contribution, can see to it that his equipment is in complete repair well in advance of harvest, and in operation a maximum of hours per day during harvest.

Combine Capacity

The accompanying table on combine capacity is taken from Circular 529 of the University of Illinois College of Agriculture.

The HIGH capacity per hour shown in the table assumes that the combine is working at top efficiency and the crop is in ideal shape for harvesting. The LOW capacity shows what can be expected if time is lost through slow operation or by breakdowns, through need to service the combine and to truck and travel between jobs, and if the beans are weedy or tough to cut. An operator's past experience will help him decide what capacity he can count on.

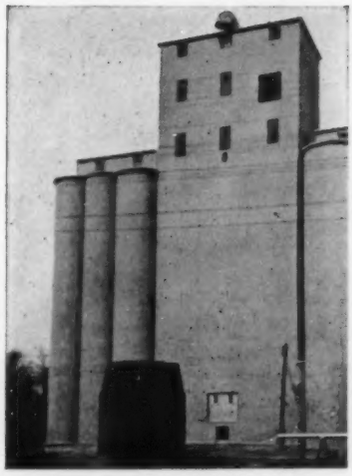
SOYBEAN HARVESTING CAPACITY PER SEASON FOR COMBINES

Allowing for turning, servicing, and unloading

Width of cut (feet)	Acres per hour*		Acres per season					
			Minimum season (125 hours)		Average season (150 hours)		Maximum season (210 hours)	
	Low capacity	High capacity	At low capacity	At high capacity	At low capacity	At high capacity	At low capacity	At high capacity
3.3	.66	.82	83	103	99	123	138	172
5	1.00	1.25	125	156	150	188	210	262
6	1.20	1.50	150	187	180	225	252	315
8	1.44	1.76	180	220	216	264	302	370
10	1.50	2.00	188	250	225	300	315	420
12	1.80	2.40	225	300	270	360	378	504
16	2.40	3.20	300	400	360	480	504	672

*Capacity per hour per foot of cut is greater for the small combines than for the larger ones because they travel faster in cutting and less time is lost in servicing, adjusting, and traveling between jobs.

HOW TO HANDLE RECORD CROPS



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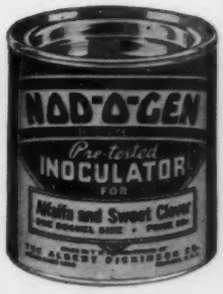
- Special high strength, interlocking, diagonally pointed staves.
- Steel hoop reinforced.
- Long life, low maintenance, yet portable if necessary.
- Capacities and arrangements to your specification.

THE NEFF & FRY COMPANY
CAMDEN, OHIO

Also Concrete Monolithic Bins

NEFF & FRY STORAGE BINS

THANK YOU!



The season just closing is the largest in NOD-O-GEN's history. It follows several seasons, each of which has been larger than the preceding. This steady growth is further evidence of NOD-O-GEN's excellent field performance. To all growers and dealers who have had a part in this expansion program, the makers of NOD-O-GEN present their sincere thanks.

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WATCH 'EM GROW INTO DOUGH

- **Balanced farming says: "Feed More Proteins!"**
- **Economy shouts: "Feed More Proteins!"**
- **Patriotism thunders: "FEED MORE PROTEINS!"**

Hog farmers and soybean farmers this year march toward a common goal, that of relieving the acute fat and oil shortage caused by the Jap blitz. Feed all the meal from the expanded soybean crop into piggy's trough, and it will mean an enormous flow of lard into the nation's rendering kettles, say Iowa economists. Soybean meal also fills admirably the protein needs of the poultry feeder, the dairyman, the beef cattle farmer.

Never have adequate protein supplements in the livestock ration been of such paramount importance — and never have they offered such big dividends. Never has the supply of such protein-rich supplements as soybean meal been so ample as it will be this year. Never has such an insistent call of "More! More! MORE!" been directed toward the nation's livestock farmers. Our far-flung gallant armed forces, hungry millions in the United Nations, toiling men and women in our factories, all demand muscle-building meats. Protein supplements help supply the answer.

HONEYMEAD PRODUCTS COMPANY
Cedar Rapids, Iowa

STANDARD SOYBEAN MILLS
Centerville, Iowa

THE CLINTON COMPANY
Clinton, Iowa

SPENCER KELLOGG & SONS
Des Moines, Iowa

SWIFT & COMPANY
Des Moines, Iowa

SIMONSEN SOYBEAN MILL
Quimby, Iowa

SOY BEAN PROCESSING COMPANY
Waterloo, Iowa

DANNEN GRAIN & MILLING COMPANY
St. Joseph, Missouri